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SUGGESTIONS FOR REGULATING THE POTATO INDUSTRY IN THE NORTHEASTERN STATES*

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In the past two years there have been numerous discussions of ways and means of improving the potato industry. Various plans have been suggested, mostly along the lines of improved methods of marketing. From a regional or national viewpoint, however, little or nothing has been done that has resulted in any improvement of conditions in the industry, probably because there has been no agreement as to just what should be done. It must be recognized also, that in many of the important potato growing sections the prevailing idea seems to be that nothing should be done; that the potato grower should be permitted to run his own show. This seems to be particularly true in the northeastern states. From correspondence I have had with a number of the leaders in the industry in these states in the past weeks it is apparent that many of the growers are opposed to governmental regulation or supervision. They seem to feel that government interference with farming, as some defined it, is very undesirable and will in the long run be detrimental. On the other hand certain leading growers are of the opinion that something should be done and done soon; one writing, "unless some strong plan to control production and distribution is adopted the best of the potato growers will be on a subsistence level and the less efficient will be starved out." There are those, of course, who believe that the "starving out" process would be very desirable and that it would solve our difficulties. We know from past experiences, however, that this is a slow process.

In addition to the attitude expressed by these growers there is a larger group who would be opposed to interference in the potato industry if there were no government regulation of any of the farm crops.

*Paper read before the Northeastern States Agricultural Conference, November 9, 1934.

Since there is regulation in other crops, however, they feel that the potato crop should also be regulated. One of the leading growers in the northeastern states recently wrote: "Probably the best way to put an end to government supervision of the farming industry is to encourage it to grow to a point where it will interfere with the freedom of action of so large a part of the population that it will break down from the weight of the opposition."

It is apparent from discussing the question of government regulation of the potato crop with leaders in the industry that there is no accord in their beliefs. This I believe to be due, in part at least, to the fact that it appears to be extremely difficult to devise a workable plan that would improve conditions. We, in the northeast, plant approximately 20% of the acreage and produce more than 30% of all the potatoes grown in the United States. If, therefore, the potato industry is in need of regulation, we should have a voice in the proceedings. We must have in mind the fact that other sections are insisting on some form of regulation, and the indications are that they will be heard. It is important, therefore, that we see to it that any plan which is adopted will not seriously interfere with our interests.

I am frank to say that I have no plan. It is merely my purpose to present for your consideration certain suggestions with the thought that from these we may develop a plan which would make it possible for the potato grower to earn a living.

It is hardly necessary for me to say that the growers' situation is not a happy one. With but few exceptions, all potato growers along the Eastern Seaboard lost money this year. It must be pointed out also that current prices are reported to be the lowest in 20 years and present indications are that we can look for but little improvement in the near future. This situation is rather difficult for the potato growers to understand, particularly in view of the fact that through the operation of various codes they were compelled to pay much more than last year for their fertilizer, containers, machinery and other materials and supplies. Many growers are asking how it is that the manufacturer can set a price which will enable him to make a profit when they cannot be assured of a reasonable profit for the crop they grow.

It is true that low prices are not new to the potato growers. I recently read the following statement in an agricultural journal published in 1925. "The situation this year in Aroostook County is particularly severe since the growers in many cases have been unable to realize a price sufficient to pay the cost of production." Low prices

are to be expected under our present system. As one grower wrote: "it would be more satisfactory if we could so regulate things that we could make a fair profit every year but it is not possible to do so with a crop such as the potato which is so dependent upon the forces of nature. I am therefore resigned to the idea that, as a potato grower, I must take the poor year with the good and trust that in the long run I can do at least as well as the average. Potato growing certainly will have to be profitable over a period of years to the average grower or they will not grow them."

In any consideration of present low prices there are, however, certain questions which must be answered. Are the low prices due to the present economic situation or to over-production? In deciding this question we must distinguish between a temporary situation and a condition of continued over-production. According to J. B. R. Dickey, "we have averaged about the same total production for the past 20 years with a population increasing over a million per year, and yet, so far as we know, every one has been getting all the potatoes he wanted to eat." This suggests, of course, that the demand for the potato has fallen off. We know that the consumer is turning to other vegetables, due in part, at least, to dietary propaganda against the potato. We must realize this fact and either decrease production to meet consumption demands or increase consumption. We have heard a great deal the past few years about apples for health, vegetables for vitamins, but the potato seems to be associated with fat; a mistaken idea but a prevalent one. If we are to continue the substitution of other products for the potato in our diet, then unless something is done to increase consumption we can be certain that we are not faced with a temporary situation but really have over-production.

In this connection it must be pointed out that present indications are but little better for next year since preliminary intentions to plant in the southern and intermediate states indicate a reduction of only 2 per cent in acreage as compared with 1934. The leaders in these states fully appreciate the seriousness of the situation and have recommended that the acreage be reduced 18%. This is a sound recommendation but we realize that the individual grower is not likely to adopt it of his own free will. If some do, past experience teaches us that what they reduce will be more than made up in increased plantings by their neighbors. It should be clear that, when left to the decision of the individual grower, a reduction in acreage will come about only when he finds it to be impossible to obtain credit. We must remember that the individual grower has the land, the necessary equipment for planting large acreages; he has his taxes and interest charges to meet and

consequently he considers it necessary to plan a sufficiently large acreage to insure returns on his investment. He fails to realize that the accumulative effect of thousands of growers following this practice results in over-production and low prices. We must therefore face the fact that if we are to have a reduction in acreage we can depend but little on accomplishing this by voluntary action on the part of the individual grower.

In discussing this problem, however, we must not make the mistake of concluding that a reduction in acreage is a cure-all. We must all realize that a reduction of 10 to 15% in acreage in 1935, with favorable growing conditions, may well result in as many potatoes as were produced in 1934. The situation this year, for example, would have been much worse for Virginia, New Jersey, Long Island and other states had there been a normal production in certain of the western states.

We are now planting fewer potatoes than we did 20 years ago. We are, however, much more efficient. In the decade 1910 to 1919, for example, we produced 340,348,000 bushels of potatoes on 3,777,000 acres. In the 10 years from 1923 to 1932 the acreage was reduced 622,000 to 3,155,000 acres but the total production was larger by more than 25,000,000 bushels. A good example of increased efficiency is apparent from a consideration of the New Jersey potato industry. In the years 1910 to '14 the average acreage was 91,400 and the average total production 8,981,800 bushels. In the past 5 years an average of 42,000 acres was planted and the total production was 7,000,000 bushels We must realize then that with the more general adoption of improved practices in potato growing, together with favorable growing conditions, an appreciable decrease in acreage would not necessarily result in a like reduction in total production.

It is a question also whether we are justified in demanding that each grower reduce his acreage in the same proportion. There are certain areas which, because of their soils, climate and other factors, are able to produce potatoes of a high quality as compared with other sections. There are, also, individuals in all areas who are more efficient than are others. Are these sections and individuals to be penalized to help the inefficient growers? This would appear to be a very unsatisfactory solution of our problem. If, however, it could be accomplished in no other way then, possibly it can be justified since the efficient grower would at least be assured of larger returns on the crop he produces.

Most of our attempts to regulate the potato industry in the past have been largely directed toward some form of regulation to prevent

price cutting, through controlling the shippers. As will be pointed out later, this is of unquestionable value but it is true that if we are to continue to produce in excess of market demands no form of marketing organization will offer a satisfactory solution to our difficulties. If we are to regulate, we must first devise some method of control of the individuals engaged in the industry. As previously indicated, however, a mere reduction in acreage will not suffice. When this has been accomplished we will still be in need of a system of marketing which will prevent unnecessary price cutting.

Various attempts have been made to improve our marketing conditions. Many have failed. We must recognize that to develop a marketing system which would meet the diverse requirements of the northeastern states would be difficult indeed. Maine, for example, moves most of her crop out of the state by rail or water. In Pennsylvania, on the other hand approximately 90% of the crop is moved by truck, a large portion being moved by the growers by direct sales. Obviously it would be difficult to devise a system which would be applicable to these two states. The mere fact that difficulties are to be encountered in formulating a marketing plan should not, however, deter us from making the attempt. We know in New Jersey, for example, that the old system of marketing the crop has cost the growers enormous sums. We have in New Jersey some 30 dealers all competing on the same markets. These dealers admit their inability to maintain prices under the old system. In New Jersey, as elsewhere, the dealer finances the grower to a considerable extent. In order to insure collections he accepts all the potatoes hauled to him, realizing that if he does not, another dealer will get them and as a consequence he may be unable to collect his outstanding bills. As the direct result of this procedure the individual dealer rarely, if ever, knows how many cars of potatoes he will have on the tracks at the close of the day's business. This often results in loading far in excess of the market demand and as a consequence the dealer cuts the price in order to clear the tracks. Under the New Jersey plan all dealers operate under one quotation committee and only one price is quoted. At the same time the loadings are regulated. This system has worked successfully in New Jersey for two years and it is generally agreed that it has resulted in increased returns to the grower. That prices are maintained by this system is apparent from the fact that, toward the close of the present season, when the dealers returned to their own offices they agreed to maintain the price; —by working together in one office they had done this for two months. The day they returned to their own offices the price was cut—and no one knows who cut first.

A similar organization was tried out in an informal way by a number of dealers working in cooperation with the growers on Long Island. I have no definite information on the outcome but it is reported to have helped maintain prices.

We in New Jersey realize that this system is by no means perfect. We have found much to our surprise, however, and much to the surprise of others, that something along this line can be done. Despite the many predictions of failure we have carried on for two years—we have overcome various obstacles which are certain to come up in any attempt of this kind, and we feel that we are in a position now to have a much more effective organization another year. We are convinced also that had competing areas operated under a similar system this year with a joint committee to consider prices, the results would have been even more satisfactory.

We repeat that we recognize the difficulties to be encountered in attempting to set up an organization of this or of a similar nature for a region such as the northeastern states, but we insist that until something of this kind is done the potato growers will not receive what they should for the crop. It is probably true that the development of a satisfactory system of marketing would do as much or more toward solving our difficulties than any other one factor.

Along with a reduction in acreage and a more efficient marketing system there are certain other points which should be considered in connection with any attempt to improve the industry. These points need to be considered since it is possible that they could be brought about with less difficulty than those previously mentioned. From the contacts I have had with the Maine growers for example, it appears that they question the value of a marketing program. Following a recent conference of some of the leading growers and dealers on this question I was advised as follows; it was their opinion "that a marketing agreement would be of no assistance to the Maine deal due possibly to the fact that such an agreement could easily be enforced in this area, but would be difficult to enforce in New York, New Jersey, Pennsylvania, and bordering states, due to the trucking in these areas." The group further expressed the opinion that "nothing should be done to make potatoes a basic commodity, but if something has to be done this would be the lesser of the two evils."

We all appreciate the fact that the potato is not at the present time a basic commodity and, since the essential feature of the act governing the basic commodities calls for a processing tax and benefit payments it is doubtful if any way can be found of including potatoes without its modification. There is considerable question as to whether

the northeastern potato growers really desire this type of set-up. It is certain however, that the majority are strongly of the opinion that other producers should not be permitted to shift to potatoes from the basic commodities in which the acreage is regulated. This was done in 1934. If the inclusion of the potato crop as a basic commodity will prevent the grower, who is receiving benefit payments, from planting the potato crop, it would be well for the northeastern states to see that this be done.

There are certain other ways in which the potato industry may be regulated. While all are important only brief mention will be made here with the thought that they may serve as a basis for discussion.

A number of growers have suggested that credit to the potato grower should be restricted. It is unquestionably true that had less government credit been advanced this year the acreage planted would have been considerably less. Some growers insist that no government funds be loaned for planting the potato crop in 1935. This is the extreme view and probably would not be desirable. It would seem to be fair however that where the various Production Credit Associations loan money for next year's crop they do so only after the borrower signs an agreement to the effect that he will reduce his acreage 20% below the average of the past 5 years and will not increase any other cash crop over his 5 year average.

There would probably be no better way of accomplishing this than through including the potato as a basic commodity. I have been informed that there is a close relationship between the Agricultural Adjustment and the Farm Credit Administrations. The latter organization will not loan money to any grower unless he contracts with the A. A. A. to adjust his acreage in the basic commodities or has signed an agreement that his farm operations will conform to the policies as promulgated by the A. A. A. in basic commodities. It should be understood that the inclusion of potatoes as a basic commodity would not interfere with those growers' activities who can finance their own plantings since adjustment contracts are not compulsory but are made with voluntary cooperators.

Unfortunately the mere restriction of government loans will probably not suffice. We must realize that if these are restricted to a point where there is promise of a considerable reduction in acreage, moneys from private sources will be forthcoming to largely offset the decrease. The realization of this fact no doubt, accounts for the following resolution adopted at a recent meeting by the South Carolina Vegetable growers. "All forms of contracting, as well as time sales of fertilizers and supplies, tend to encourage uncontrolled acreage with

a consequent over production. We favor legislation which will regulate, curb, or prevent entirely the indiscriminate production of vegetable crops under contract." In the past 15 years the potato acreage in North Carolina has increased 94%. I have been informed that a large part of the increase has resulted from the activities of outside agencies operating in the state. Unless some means is developed whereby this system is curbed we cannot hope to accomplish the desired reduction in acreage. It is difficult to control private capital but where the livelihood of thousands is threatened as the result of certain abuses it would appear desirable that the effort be made.

Still another method of controlling the volume of potatoes available for market has to do with the prevention of shipments, interstate, of all second size potatoes; obviously this would need be enforced only when the total production is high. In this way a surplus could be avoided in some years. It has been suggested also that where the withholding of second size potatoes does not reduce the surplus to an extent sufficient to improve prices, the grower should be prevented from shipping all potatoes which do not meet certain grade requirements. By this means it is certain that a very large per cent of the total crop, possibly one-third or more, would not be shipped. The consumer would then be assured of a decent quality product and the grower a fair price. The particular merit of this suggestion lies in the fact that those individuals or sections, which produce a high quality product would not be penalized. It would be difficult to enforce this type of regulation but it could probably be carried out with less difficulty than some of the suggestions previously mentioned.

THE DEVELOPMENT OF THE POTATO INDUSTRY IN AUSTRALIA

A. C. Foster

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Potatoes were brought to Australia by the first settlers in 1788. In the "Historical Records of Australia"* we find lists of provisions, etc., which were prepared when fitting out the various ships in England and these lists included potatoes with other garden and farm seeds.

Captain Watkin Tench of the Marines,* giving an account of the settlement at Port Jackson, November 1790, said "vegetables are scarce although the summer is far advanced. Owing to want

*From Documents in the Mitchell Library, Sydney.

of rain our farmers with this and poor soil are in wretched conditon. My winter crop of potatoes, which I planted in days of despair March and April last, turned out very badly when I dug them two months ago." He goes on to say that "Edward Dod, who conducted agricultural operations for the Rev. Mr. Johnson at Rosehill (afterwards called Parramatta) recommends strongly the culture of potatoes on a large scale and says that if they are planted even as late as January, they would answer, but this I doubt."

The first potatoes to be grown in Tasmanian (then known as Van Dieman's Land) soil were grown by Portlock, who commanded the "Assistant" on Bligh's voyage in 1791-'92, and followed the Port Jackson plantings very closely.* This may seem strange as the first settlers under Bowen did not land as Risdon until September 11th, 1803, but the explanation is in the fact that Portlock took some soil from Adventure Bay in barrels and grew potatoes on board the ship.

Cultivation of the potato, however, made rapid strides in all of the early settlements, but for many years made more progress in Tasmania than elsewhere. For instance, R. M. Martin in his History of Australia 1853 says that "In 1828 there were 1,292 acres planted in Tasmania and the following year 1,751¼ acres which yielded 5,192 tons of potatoes." It was 1863 before New South Wales reached 1,788 acres, yielding 3,496 tons. In that year only 20 acres were planted at Port Phillip.

The system of planting and cultivation adopted today varies only slightly from that in vogue in those days. "Earthing up" was in general practice, for Chauncy writes that "potatoes should be well 'earthed up' and blossoms picked off as they appear." He also speaks very highly of the variety known as Brown River potatoes of Van Dieman's Land. It grows to a moderate size, is of brown color and the skin is inclined to be rough." He says, "The ordinary produce of an acre of good soil is 5 tons, although we have known of 12 tons in Van Dieman's Land. Small whole seed germinates best, but cut large seed gives best crops if it germinates well."

Varieties

Considerable changes have taken place with regard to the varieties grown in Australia over the past 25 years. As early as 1850 the Circular Head or Browns River Redskin, grown in Tasmania, was one of the most favorably known varieties in Australia

and was in good demand on the Mainland markets. This variety, however fell a victim to the early outbreak of Blight in 1908 and soon was not grown commercially.

Tasmania is the principal exporting state and sent the first shipment of potatoes to Sydney in 1830. When the Redskin failed the Brownell came into favor. This is an Adirondack type and is the main crop variety in Tasmania while the early grown variety for export is the Bismarck. This is an elongated variety, mottled with red and having a broad, purple eye. In recent years, however, another strain has been developed known as the Silverskin Bismarck which has come into general favor. This is entirely white except for the characteristic broad, purple eye.

In Victoria the main crop consists of Snowflakes; a heavy cropper of the white elephant type, but of poor appearance. The Carman is favored in the early crop and is generally superior to the Snowflake, except that it is softer and suffers more damage during transportation.

Various strains of Up-to-Date and some colored skinned varieties such as Sussex Red and McCormick Red are also grown in Victoria but not to any extent commercially.

In New South Wales blue skinned potatoes of the Manhattan type were formerly popular but lately have gone very much out of fashion. The principal varieties grown for both early and late crops are the Factor and Up-to-Date types, which were brought from New Zealand to the Crookwell district about 25 years ago. The variety known as Brownell's in Tasmania is also grown to a limited extent in New South Wales where it is marketed as Satisfaction.

In Western Australia considerable developments have occurred in potato production during recent years. Formerly this State imported her principal requirements from the Eastern States. Owing largely to the development of suitable strains of Delawares and the opening up of varying types of country a succession of crops is now harvested two or three times during the year.

Queensland too, has developed its potato industry although so far no single variety is particularly favored. The varieties Brownell's, Carman, and Up-to-Date are grown in the southern districts and Bismarcks from Tasmanian seed, in the northern districts. From Brisbane, 400 miles north, two plantings are made each year in February and June respectively. From Rockhampton, 500 miles

further north, the main planting is done in February with smaller areas planted during July.

Victoria produces approximately 50% of the Commonwealth's supply, Tasmania, 25%, and New South Wales, 13%. New South Wales has the greatest consumption, Victoria the highest production, but Tasmania is the principal exporting State and Tasmanian Brownell's and Bismarcks command £2 per ton premium over other varieties in the Sydney market.

The average yield per acre varies little among respective States and is slightly less than 3 tons per acre. The highest record production is in Tasmania where in 1932, 28 tons of the Arran Chief variety were produced from 1 acre of reclaimed swamp land near Smithton, without the use of fertilizer.

Diseases

An article in the New Zealand Country Journal, November, 1890, gives a short account of the potato, and reports having seen potato blight in New Zealand, although the disease was generally believed not to exist there at that time. It was some years later before the disease was officially recorded, and 18 years later before the first serious outbreak occurred in Australia in 1908. The incidence of Blight has not been so widespread or severe in recent years. With the exception of a few market gardens, no preventive measures are taken in the way of spraying or dusting.

Virous diseases are probably the most important economically and Agricultural Departments in the various States have done good work by demonstrating very clearly that yields can be materially increased by systematic roguing and the practice is growing considerably. Most of the common diseases of the potato are present but Canker has so far been avoided.

Consumption

From 1873 to 1890 the consumption in Australia averaged about 117 tons per thousand of the population. The average annual consumption for the following periods are:

Years	*Consumption per 1,000 of Population*	
	Tons	*Lbs. per capita*
1873-1890	117	262
1900-1910	94.5	211
1911-1920	72	161
1921-1930	69.8	156
1928-1932	58	129

This falling off in consumption is no doubt largely due to the increased availability of a wider range of choice in foodstuffs, but due also to some extent to the advertising propaganda for other food lines.

Marketing Systems

Victoria: Victorian growers sell the whole of their crop to their local merchants. Forward sales by farmers in parcels of 50 to 100 tons are much more common than in any of the other states. Victorian shipments to other states are invariably made by produce merchants and not by growers.

Tasmania: Tasmanian growers have the choice of selling on the farm or f. o. b., or of shipping to a registered commission agent in Sydney. Tasmanian produce merchants sell direct to merchants in other states when possible, and forward their surplus to Sydney commission agents who handle the consignments on an average basis of 5.%

New South Wales: The early crop in the metropolitan area is disposed of direct to retailers. Northern River growers forward their consignments to Sydney commission agents by steamer, while the late crop is delivered to Sydney mainly by rail and is sold at Alexandria Goods Yards. Some consignments are offered at auction but most sales are made by merchants or commission agents by private treaty.

Queensland: Farmers' consignments, forwarded to Brisbane by rail, are usually sold at auction. Any shortage in the local crop is made up by merchants importing from the southern states. Individual consignments sold at auction in Brisbane bring relatively high prices, but it is noticeable that there is a wide range between the highest and lowest price on any given day and also wide fluctuations from day to day as compared with sales at Sydney.

Sydney's approximate weekly consumption is 26,000 Chapman sacks (15 to the ton). Two ships arrive each Monday from Tasmania carrying potatoes, while considerable quantities arrive from local sources and Victoria. Each Monday morning the Sydney potato commission agents and merchants hold a meeting. The Tasmanian growers' representative supplies the figures relating to the week's shipment and after considering potatoes arriving from other sources, the prices for Tasmanian varieties are fixed by resoluton of the meeting and rule as the f. a. q. prices for the current week. While this results in an ironing out of prices to some extent as between grower and grower, it is claimed that a more stable market results and this, in the long run, is a distinct benefit to growers.

The Surplus

In common with other parts of the work, Australian growers suffer periodically because under favorable climatic conditions high yields per acre produce a surplus over market requirements. This can be best illustrated by stating that in a year when Australian production amounts to 300,000 tons, the growers aggregate returns are one million pounds sterling greater than in a season when the total production amounts to 400,000 tons. This fact has been responsible for much discussion and various suggestions have been made for overcoming the difficulty. One of these, which aimed at using higher grades to compel farmers to keep the surplus on the farm, got so far as the holding of several interstate conferences, but the natural conservatism of growers was responsible for a halt being called before any decision had been arrived at.

THE POTATO AT THE EXHIBITION OF THE IMPERIAL INSTITUTION OF NUTRITION AT ERFURT

H. von Rathlef

Halle, Germany

In Germany, as in all parts of the world, the horticulturist was accustomed to appear at an exhibition with the greatest possible assortment of his products. By means of an imposing prospectus, the reporting of favorable results of experiments, and through the most advantageous presentation of the varieties on exhibition, the grower attempted to convince the visitor that his product only was sufficient for all needs. Naturally, with the exhibition organized in this way, the scientific grower is the loser, for he shuns forcing his plants intensively or for exhibition purposes and avoids showing exceptionally good samples which do not correspond to the normal field harvests. For the farmer also there arises the difficult, and often wrongly solved problem, of selecting the variety adapted to his needs from the numerous varieties on exhibit, most of which are only supposedly independent varieties.

In contrast, this year's exhibition of the Imperial Institute of the Vocational Union of German Agriculture, and all associated industries showed what these branches of German farming and allied trades can accomplish.

In place of the approximately 135 different potato varieties of

previous years, of which generally only a very limited number could be sold, the simple prospectus listed only 85 plants from 27 growers and horticultural organizations. The potatoes exhibited consisted of those varieties which, on the basis of cultural experiments conducted by impartial institutions or organizations, proved to have economic value. Until further notice these varieties will be given seed recognition and preferred freight rates in plant trade. It is expected, of course, that a number will be discarded in coming years. To the American farmer, who is concerned with about a dozen types comprising several varieties, the number of varieties exhibited will seem somewhat large. With the great differences in German soils and climatic conditions, however, and with the diverse demands of the consumer on the one hand and the potato-consuming industries on the other; together with the necessity, in the limited German territory, of having sufficient for all existing needs and possibilities, the number of varieties seems to be justified.

This year the potato exhibits were arranged according to the time of maturity. Ten early, twenty middle-early, forty middle-late, and fifteen late varieties completed the assortment. The marked predominance of the middle-late varieties is determined by the German climate. These produce most of the potatoes for German consumption and also have by far the most extensive field cultivation. To this group belongs also the standard German food potato, Modrow's *Industry*. The grouping according to time of maturity made it possible for the observer to make direct comparison of the different varieties.

Corresponding to the prevailing tendency in Germany, most of these varieties are yellow-fleshed. Only thirty are white and to these belong principally the potato varieties rich in starch which are used in manufacturing.

In the selection of the assortment, the question of susceptibility to the scab diseases was very important. Only twelve of the varieties now allowed in trade are susceptible. Among the susceptible varieties still permitted, is unfortunately, *Industry* at one time indispensable in Germany. Most of the other susceptible varieties are old or very old types of less significance, which, however, are peculiarly adapted to unfavorable conditions and can not be replaced. These include Cimbal's *Alma* and *Prof. Wohltmann;* Richter's *Early Yellow,* and *Model;* the latter, a variety acclimatized by a horticultural society and very highly valued in East Prussia. All the varieties recently

introduced into trade are immune to the scab disease. For many years the National Biological Institute has worked toward this aim, in that it has carried out disease-immunity experiments for horticulturists, gratis or for very low rates. For many years the principle has held in Germany that no new susceptible varieties be given seed recognition. This is absolutely necessary in view of the great danger which the potato scab diseases present, especially in the industrial regions with dense population, where the people are often forced to produce potatoes year after year on the same land. For many years also the suceptible varieties have been prohibited in regions which have evidenced the least occurrence of potato scab.

From the above one might think that the possibility of new varieties is excluded in Germany. This is, however, not the case. In the exhibition were shown a number of new varieties whose fate will be decided in the next few years. They will come into use only when their value has been determined with all certainty, and then they will probably supplant one or the other of the present varieties. The present group of varieties as now fixed shall by no means remain a rigid, unvariable conception but shall be improved as much as possible by constant selection.

SECTIONAL NOTES

IDAHO

The 1934 season has been one of the poorest the Idaho growers have experienced in the past eighteen years that I have been in touch with the industry.

Presumably, part of our trouble dates back to the winter of 1933-'34. Seed potatoes apparently came through the winter in very good condition but there were a great many complaints this spring of seed rotting in the ground. This seemed to be equally bad both in our irrigated districts and the higher altitude unirrigated lands. We also had considerable trouble from maggots so that poor stands were quite prevalent. The next cause of trouble came from growers fearing a shortage of water in the latter part of the season. This induced them to plant a month earlier than they normally do—that is, from the first to the middle of May rather than during June. This condition was aggravated by excessively hot weather the latter part of July. This, together with a real shortage of water, caused irregular growth; also

a certain amount of vascular infection. All of this resulted in approximately 60 per cent of our crop being either No. 2's or culls.

Our seed growers didn't escape. In checking over our list of growers whose stock passed the field regulations for certification, I find that we produced about 87,000, 100-pound sacks of seed. Inasmuch as the drought condition which prevailed during the winter continued throughout the growing season, in most districts, a very large part of the crop was misshapen. From the disease standpoint, our seed potatoes made a rather better than average showing, although I am wondering now whether or not the potatoes were more free from disease or whether growing conditions obscured the symptoms.

The harvesting season was, on the whole, rather favorable this year and all stocks were harvested with little frost or other damage. Our growers really have some things in their favor. The fact that the heavy production of potatoes in the United States is well toward the east rather than the west has resulted in their receiving more for their stock than might be expected considering the total United States crop. (Dec. 7).—E. R. BENNETT.

INDIANA

Our potato harvest is over and practically everything has either been placed in storage or sold. We find that the price is still fairly good although the local trade is offering good Indiana potatoes, well graded, for approximately $1.00 per hundred pounds in the northern areas and from 10c to 15c better in central and southern Indiana. Poor, trucked-in potatoes are selling for 60c to 80c per hundred pounds, depending to a great extent on the quality.

Our top field-run yield in the state this past year was a little over 700 bushels to the acre. Our official top yield for the 400 Bushel Potato Club went to Otho P. Bryie, Churubusco, Indiana, with a yield of 470.81 bushels of No. 1 potatoes and a total yield of 539 bushels.

There is considerable interest being shown at this time for next year's plantings and we have many inquiries in regard to good seed stock. I believe the outlook for 1935 will be for as large, or perhaps a larger acreage, than was harvested this year. (Dec. 7).—W. B. WARD.

KENTUCKY

Our certified seed cobblers are of exceptional quality this year, the percentage of scab being considerably under 3%. About one-third of

the area was affected by a drought to the extent of reducing the yield about 30%. The seed, though small, is quite acceptable. In the larger part of the district, yields averaged well over 135 bushels per acre, which means that the tuber size is extraordinarily good. In a few lots, some culling of oversized potatoes needed to be done but this amounts to less than 5%. (Dec. 8).—JOHN S. GARDNER.

NORTH CAROLINA

Following up demands from county potato committees and organizations, the executive committee of the Eastern N. C. Potato Growers has set up a tentative program of action as outlined below. The committee believes that this program reflects a majority opinion as to the things needed.

The main objective of the program is acreage reduction or acreage control, with a penalty provision, effective on the non-cooperator. The majority of the growers do not favor rental or benefit payments as an inducement for signing.

Potato growers prefer a simple acreage reduction plan which would permit the shipping of all the potatoes produced on the allotted acres. They are requesting that a preliminary acreage reduction agreement be drawn up and that a sign-up of the growers be started immediately.

Acreage Control

(a) *Basic Commodity Idea:*

This would require Congressional action. (If potatoes are made a basic commodity, growers want penalty provision written into the law in order to get protection from the non-cooperating grower.)

(b) *Simple Acreage Reduction Agreement:*

This would require passage of legislation permitting the grower to enter into simple acreage reduction agreement with the Secretary of Agriculture. This agreement would become effective when signed by a two-thirds or three-fourths majority of the growers and should contain a penalty provision for non-signers. (This plan could be adopted on a sectional basis if signed by the necessary majority of growers.)

Marketing Agreement

Growers are not in favor of the present Marketing Agreement without an amendment providing for allotments to individual growers before planting time. Even if such an amendment is possible, a majority of the growers seem to prefer a simple acreage control plan. A marketing agreement might prove acceptable as a means of providing orderly marketing in case of a market glut or other extreme emergency, but growers believe that acreage reduction is the prime objective, and that a marketing agreement could be set up later if needed.

Share Planting

The following resolution was passed by the executive committee at its last meeting:

> Whereas, we are convinced that marketing agreements, making potatoes a basic commodity, or limiting the production by force of law, will not cure the unfair and oppressive hold which the shippers, handlers, middlemen, buyers, operators, and supply dealers have upon the marketing machinery of potatoes, and will not cause a free flow of potatoes to market at a price which the consumptive volume should command;
>
> Therefore, we now request that the legislature of the State of North Carolina and the Congress of the United States cause separate and distinct inquiries to be made into the activities of all those engaged in marketing potatoes; (including shippers, handlers, growers of potatoes on contract or share planting, large buyers, dealers in supplies, and others) with a view to ascertaining what the facts are as to marketing, and of taking the necessary steps to curb the abuses shown, so as to return to the potato farmer a greater percentage of the retail dollar by cutting down the profits of or, if necessary, by eliminating entirely, the agencies which stand between the grower and the eventual consumer of potatoes.

Funds:

The executive committee is recommending that a voluntary contribution of 5c per acre be requested from all potato growers for use of the committee, and that the various county committees request an additional donation of 5c per acre for local use if there is a need for

such a local fund Funds for the use of the State Executive Committee should be forwarded to R. L. Spencer, Secretary-Treasurer, Eastern North Carolina Potato Growers, Columbia North Carolina.—DUDLEY BAGLEY.

NEW YORK

The Empire State Potato Club will hold its annual meeting at Rochester during the week of January 7th. The Potato Club is the largest state-wide organization of potato growers in New York State. The attendance at the annual winter meeting approximates 350 and the attendance at the annual summer one-day meeting varies between 4,000 and 6,000. It is anticipated that there will be some spirited discussion at the coming meeting concerning the future of the potato industry, particularly in regard to co-operation with other states and the federal government, looking toward improvement in the price situation.

As part of the nation-wide relief program the T. E. R. A. is in the market for some 300 carloads of potatoes to be purchased from New York growers. The allotment is to be distributed over 18 surplus counties and the price is to be 62 cents per 100 pounds of U. S. No. 1; graded, sacked, and in the car. This means that the potatoes will net no more than 25 cents a bushel at the farm. This is but very little above the value of potatoes as stock feed. It will be of interest to know how many contracts are signed.

The potato growers of New York State ought to take an active part in the discussion incident to the adoption or rejection of any proposed scheme to readjustment of the potato industry for the nation as a whole. This year the northeastern late surplus states have produced one third of the total crop of the United States. The growers in this section should appreciate the necessity for action, not alone to protect their own interests but as a duty they owe to the other potato growers to take part in an endeavor to improve the situation. (Dec. 12).—J. R. LIVERMORE.

OHIO

The Katahdin potato has been tested in Ohio for several years but it does not seem to give much promise as a variety for upland growing in this state. Tests conducted on muck indicate however that it is a promising variety for muck crop production. There is

but one objection to the Katahdin in that when the set is light and tubers grow somewhat over-size, the bud end tends to be extremely deep. The new Chippewa was tested on the muck this year and it slightly out yielded the Katahdin. Both of these varieties will receive further tests this coming year.

The movement of potatoes has been very slow in Ohio. Many growers have stored their crop and are hoping that cold weather will stimulate buying. The feeling is general, but there will not be much, if any rise, in prices. (Dec. 12).—E. B. TUSSING.

WISCONSIN

The total production of Wisconsin certified seed for 1934 may not exceed 150 to 160 cars. In view of the favorable prices obtained for early shipments during the latter half of August and the forepart of September, many growers of Triumph and Irish Cobbler varieties shipped to table stock markets. This year however, interest in the certified seed crop is markedly increased over the 1933 season at the same date.

The Wisconsin College of Agriculture, cooperating with growers and organizations are already planning several field projects for the 1935 season. As previously stated in these notes, the seasons of 1931, 1932 and 1933 were especially unusual on account of extremes of heat and drought occurring during the growing season. Naturally, the attention of growers becomes centered on problems that are liable to become conspicuous during seasons of this character.

Unusual interest has been aroused in potato scab, rotations and soil handling problems. This is especially true in the lighter sandy soil sections where the effects of heat and drought have been more conspicuous. Considerable attention has also been directed to practical soil management relating to scab control on account of the distribution of lime and marl this year under state and government projects in relation to the growing of alfalfa.

We also find continued interest in the study of degeneration maladies, especially in relation to our seed potato improvement projects. Tuber indexing, mainly of the Triumph variety has been started in the greenhouse. Increased interest continues also in relation to practical variety tests conducted in several sections of the state. The unusual, dry, hot seasons have influenced the be-

havior of varieties in a way to call increased attention to the newer seedlings under trial. This is particularly true in the Rural New York potato belts. We are expecting the improved strains of seed under cultivation in the state to continue to show superior merit. (Dec. 10).—J. G. MILWARD.

CANADA

Shipments of certified seed to date total 600 carlots compared with 432 cars on same date last year. The price situation, however, is not encouraging to the growers. The quality of the crop is excellent and the yield, in the Eastern area, was very good. There is the prospect of a shortage of certified seed of the early maturing varieties in the central prairies section, but local supplies in all other sections appear ample for all prospective requirements.

Movements of table potatoes to date are approximately the same as last year, but there is a reduction in the price level of about 20 cents per bushel at Montreal and Toronto, 5 cents at Winnipeg, and 30 cents at Vancouver. The few potato starch factories in operation will probably manufacture larger quantities than usual to help out the situation. (Dec. 6).—J. TUCKER.

REVIEW OF RECENT LITERATURE

Environmental and control studies of the common scab disease of potatoes. B. J. DIPPENAAR, (*Science Bull. No.* 136: (*Dec.* 1933) *Union of South Africa*).

As with the scab organism, the optimum temperature for disease development was found to be relatively constant under all conditions of constant soil moisture and of soil reaction. The optimum temperature for disease development, however, was found to be definitely lower than the optimum temperature of the particular *Actinomyces* strain responsible for the disease. It is possible that the optimum temperature for disease development may vary somewhat with the strain of the causal organism just as the optimum temperature of the scab organism may vary for each particular strain.

The optimum temperature for the development of potato scab is about the same as that for tuber development.

The importance of soil temperature alone, as a scab inhibiting factor, appears to be relatively small, for temperatures that have been

found to be unsuitable for the development of the disease, also proved to be less suitable for the development of the potato tubers.

The exact nature of the action of soil temperature on the development of potato scab is not yet clear. At the lower temperature limits for scab, it probably has more of a direct influence on the scab organism in relation to scab development than at temperatures above 23°C. At the higher temperatures it is possible that the inhibitive influence of temperature on the disease is chiefly one of biological relationship.

The moisture content of the soil exerts a much more powerful influence on the development of the potato scab organism, and on the development of the disease itself, than the soil temperature does. Increasing the soil moisture content decreases the amount of scab at all soil temperatures as long as the potato tubers continue to show active growth. At temperatures which are less favorable for the development of the disease, a lower moisture content is required to control scab than at temperatures which are most favorable for the disease.

High soil moistures appear to exert their maximum influence on scab during the first four weeks after the tubers have set, or before the tubers reach a diameter of two centimeters. Potato tubers, which have been carried past this stage of development by high soil moistures and which are relatively free from scab, remain susceptible to the disease, as long as they continue to grow. The amount of scab that will develop in a dry soil, late in the season, other conditions for the disease being favorable, depends, however, on the stage of tuber development.

The action of soil moisture on potato scab has experimentally been shown to be indirect and one of biological relationship. At high soil moisture content the growth of the scab organism is inhibited by increased bacterial activities. This fact also seems to explain the adverse effects of soil moisture on the disease after the tubers have become infected.

The influence of soil reaction on the development of potato scab varies with other environmental factors such as soil moisture and soil temperature, and with the amount of the scab organism present in the soil. Thus in soils, heavily infested with the scab organism, the soil acidity, or any other soil factor for that matter, is less effective against scab than in soils only moderately infested with the scab organism.

It has been shown in greenhouse experiments that if the soil acidity is increased to pH 5.0, e.g. by treating the soil with sulphur, before the tubers set, potato scab can be controlled. In the same

experiments soil treatments with inoculated sulphur which did not increase the soil acidity to pH 5.0 before the tubers had set, failed to control scab. The repeated failures obtained with the use of sulphur for the control of scab in a number of field experiments conducted during hot dry seasons, are ascribed to a number of factors, viz. (1) a retarded and insufficient increase in the soil acidity until the tubers had set, (2) severe soil infestation with the causal organism, (3) most favorable conditions of soil temperature and soil moisture under which the experiments were conducted for disease development and unfavorable conditions for the rapid oxidation of sulphur, and (4) buffer action of some of the soils which resisted any change in the soil acidity.

Of the three soil factors which have been found to influence the occurrence of potato scab, temperature and moisture show greater fluctuations during the season of growth or over short periods than soil reaction. Soil temperature has probably the least significance in determining the occurrence of potato scab while the soil moisture appears to be the most important factor concerned with a rapid increase or decrease of the scab organism in the soil and of the scab disease in any season. Soil moisture is the only factor which increases the yield while decreasing the disease. Soil reaction appears to be the most important factor concerned with a steady increase of the scab organism in soils which are continuously used for potato culture. Thus in soils with a reaction of pH 5.2 or lower, the disease has been shown to increase very slowly, if at all with continuous potato culture, if reasonable care is exercised in the selection and treatment of the seed tubers.—JOHN TUCKER.

Anatomical peculiarities of stems and leaves of cold resistant types of potatoes. V. A. HASSONOV and F. CH YAGER. (*Bulletin of Applied Botany of Genetics and Plant Breeding. Plant Industry in U. S. S. R.* (1932). *Series A. No. 7, pp.* 107-116).

In 1930 S. M. Bukasov found a few varieties of potatoes which were cold resistant and which survive freezing at a temperature of 5°C. H. M. Kovalenko and F. F. Sidorov found a few more cold resistant hybrids. In this paper, the authors endeavor to show the peculiarities of anatomical structure in leaves and stems of cold resistant varieties. They investigated stems and leaves of seventy forms of potatoes of which twenty forms were cold resistant.

Cold resistant forms (wild forms and their hybrids) have a more oval or round type of stem in comparison with the more

triangular type of the cultivated varieties. Practically all cold resistant forms of potatoes have a larger cortex. They also have smaller numbers of small vessels, distributed in many small groups in comparison to non-cold-resistant forms. The anatomical structure of stems of cold resistant forms of potatoes resembles more the primary structure of a stem such as in the stem tip than it does that of the stems that have undergone much secondary thickening.

S. acaule (cold resistant) has a very insignificant development of prosenchyma in comparison with parenchyma which condition is more favorable for accumulation of reserve materials in the stem. This variety has a very thick cortex. In the case of S. tuberosum starch is present mainly in the pith, where it is concentrated mainly around the vessels. In the cortex, the starch content is very low. In the case of S. acaule starch is distributed more equally in the cortex and the pith, which condition the authors connect with the more uniform structure of pith and cortex.

The number of stomata per sq. mm. on the majority of investigated forms varies on the lower surface of the leaf from 170 to 300. S. acaule has 270 stomata on the lower side of the leaf and 230 on the upper side. Thickness of leaves of different forms varies from 0.18 to 0.26 mm. Palisade parenchyma sometimes has the appearance of being composed of two layers because the next layer of spongy parenchyma has the same orientation as palisade parenchyma. This kind of structure of the leaf occurs in S. acaule, S. ajahuri, S. demissum, all of which are cold resistant. The anatomical structure of stems and leaves of cold-resistant forms of potatoes is practically the same as the structure of wild forms of potatoes.—M. AFANASIEV.

A malady of the potato in Alberta similar to Psyllid Yellows. G. B. STANFORD, (*Scientific Agriculture Vol. XV* (1934) *No.* 1: *pp.* 46-48).

There is in Alberta a malady of the potato which appears to resemble closely psyllid yellows, recently described by Richards and Blood, and said by them to be destructive in Utah, U. S. A., and present in certain neighboring states. They found the malady to be associated with the feeding on the vines of nymphs (only) of *Paratrioza cockerelli* Sulc.

Each year from 1919 to 1922, inclusive, in 1924, and from 1927 to 1933, certain potato plants here and there in central Alberta have

developed rather consistent symptoms, which suggest a type of disease different from others known here. Affected plants develop naturally for a time, then become more or less abnormal. Most common is a slight to definite swelling of the nodes, lengthening of the internodes in some plants, and a shortening of them in others, deformed axillary branching, with aerial tubers in certain severe cases, and, as a rule, few to no tubers develop. Usually plants are more or less stunted or raggy in appearance, and the leaves more or less rolled. Frequently affected plants resemble severe cases of the disease caused by *Rhizoctonia solani.* These have extensive axillary branching and aerial tubers, and the roots and stem parts below the ground are without lesions of any kind. With the exception of the Medicine Hat case, presently referred to, affected plants so far observed do not occur in close proximity, but here and there in the field.

The Medicine Hat case just mentioned was an outstanding exception, in point of severity and in its epidemic nature, to what has been described, but not essentially different in gross symptoms. Affected plants, fresh from fields of central Alberta, were compared with those from Medicine Hat in southern Alberta, and the symptoms on many plants appeared to be identical. Many plants of the Early Ohio variety from Medicine Hat exhibited the odd, bushy, and tuft-like second growth from the stalks identical with the photograph of plants shown by Richards and Blood. They stated that this type of growth is a characteristic peculiar to Early Ohio affected with psyllid yellows.

Over 100 acres in a local area in and about Medicine Hat in 1932 were a total failure. Early Ohio and Bliss Triumph failed to recover, and even small tubers were extremely scarce. Certain late varieties made some recovery late in the season. Tomato plants near-by were affected similarly. The malady was not observed in the same area in 1933.

In order to ascertain whether progeny from affected potato plants would transmit the symptoms, tubers from 20 plants of the Medicine Hat case (including all varieties affected), and from 40 plants obtained near Edmonton, in north central Alberta, were planted at Edmonton in 1933. The progeny and plants from each tuber were apparently normal in every respect. Richards and Blood found that tubers from affected plants did not appear to transmit the disease.

The Medicine Hat case was not reported until late in the season, but the general nature of attack at that time strongly suggested insects had been involved.

Whether all these symptoms described herein were caused by *P. cockerelli*, or by other insects, or agents, has not been determined. However, there appear to be many points of close similarity with the psyllid yellows described by Richards and Blood.—JOHN TUCKER.

A new method of hastening the tuberization and increasing the productivity of potatoes. USPENSKI, E. M., (*Transactions of the Potato Scientific Research Institute. U. S. S. R. Part* 1, *pp.* 72-89, (1933.)

Tubers of Epicure (early) Deodara (medium) and Silesia (late) were exposed before planting to different high temperatures in the absence of light and at varying degrees of air humidity. The temperatures employed ranged from the common storage temperature -2 to -4°C. (35.6 to 39.2°F.) taken as a check to 55°C (131°F.), the duration of exposure varying from 1 hour to 8 days. The following air humidities were maintained: (a) Natural air humidity as a result of tuber respiration (the "dry chamber") (b) 100 per cent air humidity (the wet chamber), (c) The minimum air humidity (the absolutely dry chamber). The treatments were made at different dates from January to April inclusive.

Exposure of potato tubers to the high temperature in the absence of light in the dry chamber (a) favored tuber sprouting.

Excessive air drying (c) in connection with the high temperature, had an injurious effect on potato tubers.

Excessive air humidity accelerated sprouting but was found to increase the amount of disease.

The most favorable temperature for maximum sprouting was found to be between 35 and 40°C, or 95 to 104°F. with an 8 day exposure.

Tubers subjected to 25°C. (77°F.) showed less sprout development than those previously mentioned but a maximum development of sprout disease was observed, especially in the wet chamber. The increase in number of sprouts under the influence of high temperature was followed by an increase of the stem number, that is, by an increase in the vigor of the vines.

Exposure of the seed tubers to different temperatures did not affect the time of plant emergence, flower bud formation or the beginning of flowering.

In the dry chamber (a) high temperatures (35 to 40°C.) during

8 days in January and February were found most favorable for acceleration tuber formation of the varieties Epicure and Deodora.

The temperature in February had little influence on the Silesia variety; but when exposed to a room temperature of 16°C. (60.8°F.) in April, tuber formation was hastened. Exposure to a temperature of 45° for 5 hours in April resulted in an increase yield.

Deodora was found to be very sensitive to temperature influence. —WM. STUART.

PROGRAM

OF THE

TWENTY-FIRST ANNUAL MEETING

OF

THE POTATO ASSOCIATION OF AMERICA

December 27 to 29, 1934

Thursday Morning Session, December 27, 9:30 A. M.; Room 114, Margaret Morrison College, Carnegie Tech.

1. Appointment of Committees.

2. Address by the President, J. R. TUCKER, Central Experimental Farm, Ottawa, Canada.

3. Report of the Secretary-Treasurer.

4. Report of the Seed Potato Certification Committee—WILLIAM H. MARTIN, New Jersey Agricultural Experiment Station.

5. Report of the Research Committee.

Culture, Storage and Marketing. WILLIAM STUART, United States Department of Agriculture.

Virous Diseases. DONALD FOLSOM, Maine Agricultural Experiment Station.

Potato Breeding. C. F. CLARK, United States Department of Agriculture.

Tuber Borne Diseases Other Than Common Scab and the Virous Diseases. E. S. SCHULTZ, United States Department of Agriculture.

Common Scab. C. L. FITCH, Iowa State College of Agriculture.

Fertilizer Studies. BAILEY E. BROWN, United States Department of Agriculture.

6. *General Methods Used to Produce over 400 Bushel Crops and the Trends in These Methods in the Past 10 Years.* (20 min.) J. B. R. DICKEY, Pennsylvania State College, State College, Pennsylvania.

7. *Is There Any Difference in the Productivity of Dry Land and Irrigated Seed Potatoes?* (10 min.) H. O. WERNER, University of Nebraska, Lincoln, Nebraska.

8. *Seed Value of Potatoes Produced in Different Crop Rotations with Irrigation.* (10 min.) H. O. WERNER, University of Nebraska, Lincoln, Nebraska.

Thursday Afternoon Session, December 27, 2:00 P. M.; Room 114, Margaret Morrison College, Carnegie Tech.

1. *Potato Production under Drouth Conditions.* (10 min.) DANIEL DEAN, Nichols, New York.

2. *Some Advantages in Using Whole Rather Than Cut Seed in Planting the Potato Crop.* (10 min.) H. S. MACLEOD, Dominion Experimental Farms, Saanichton, B. C.

3. *Potato Spraying in Relation to High Yields in Pennsylvania.* (15 min.) L. T. DENNISTON, Pennsylvania State College, State College, Pennsylvania.

4. *Results of Experiments with Potato Insects in New York, 1934.* (10 min). G. F. MACLEOD, Cornell University, Ithaca, New York.

5. *The Relation of Soil Reaction to Potato Yields.* (12 min.) ORA SMITH and G. C. MOORE, Cornell University, Ithaca, New York.

6. *The Importance of Soil Aeration for Potatoes.* (10 min.) JOHN BUSHNELL, Ohio Agricultural Experiment Station, Wooster, Ohio.

7. *Soil Types as Factors in Wireworm Abundance.* (25 min.) HARRY L. GUI, Ohio Agricultural Experiment Station, Wooster, Ohio.

8. *The Effects of Storage Temperatures and Humidities on the Yield of Potatoes.* (15 min.) ORA SMITH and G. C. MOORE, Cornell University, Ithaca, New York.

Thursday Evening, Opening Session, A.A.A.S., December 27, 8:15 P. M. Carnegie Music Hall.

An address of welcome will be followed by a reception tendered to the members of the Association and guests by the Pittsburgh local committee.

Friday Morning Session, December 28, 9:30 A. M.; Room 114, Margaret Morrison College, Carnegie Tech.

1. Business Meeting, Report of Committees and Election of Officers.

2. *Canada's Effort to Stabilize the Potato Industry.* J. R. TUCKER, Central Experimental Farm, Ottawa, Canada.

3. *Potato Control and California's Contribution to the Control of Perishable Agricultural Commodities.* H. G. ZUCKERMAN, Berkeley, California.

4. *Potato Marketing Agreements.* KRIS P. BEMIS, United States Department of Agriculture.

5. *Suggestions for Regulating the Potato Industry from a National Standpoint.* H. B. TABB, Editor, Potato World, Chicago, Illinois.

6. Discussion.

Friday Afternoon Joint Session with the American Society for Horticultural Science, December 28, 2:00 P. M.; Room 1109, Cathedral of Learning.

1. *Relation of Pre-storage and Storage Conditions to Weight Loss in Injured and Sound Triumph Potatoes.* (10 min.) H. O. WERNER, University of Nebraska, Lincoln, Nebraska.

2. *The Potato Field Trial.* (20 min.) J. R. LIVERMORE, Cornell University, Ithaca, New York.

3. *The Disease Factor in Potato Improvement.* (30 min.) DONALD REDDICK, Cornell University, Ithaca, New York.

4. *Breeding Behavior of the Katahdin Potato.* (20 min.). C. F. CLARK and F. J. STEVENSON, United States Department of Agriculture.

5. *A Five-Year Summary of Fertilizer Results on Irish Potatoes.* (10 min.) E. F. BURK, Stillwater, Oklahoma.

6. *Relation of the Size of Seed Piece to Recovery of the Irish Potato after Killing of the Tops by Cold.* (10 min.) L. M. WARE, Auburn, Alabama.

7. *The Cooking Quality of Potatoes as Influenced by Environmental Conditions.* (20 min.) F. J. STEVENSON and ELIZABETH FULLER WHITEMAN, United States Department of Agriculture.

Saturday Morning Joint Session with the American Society of Agronomy, December 29, 9:00 A. M.; Room 113, College of Engineering, Carnegie Tech.

1. *Social and Economic Factors Relating to Land Use Planning in the Northeastern United States.* (45 min.) J. G. LIPMAN, New Jersey Agricultural Experiment Station, New Brunswick, New Jersey.

2. *Fertilizer Placement Studies with Potatoes in 1934.* (20 min.) B. E. BROWN, United States Department of Agriculture.

3. *A Comparison of Acid and Neutral Fertilizers in Potato Production Obtained in Cooperative Studies.* (25 min.)

B. E. Brown, United States Department of Agriculture.
J. A. Chucka, Maine Agricultural Experiment Station.
G. V. C. Houghland, United States Department of Agriculture.
Wm. H. Martin, New Jersey Agricultural Experiment Station.
H. H. Zimmerley, Virginia Truck Experiment Station.

The Relationship in Extension, Research and Teaching Agronomic Problems.

4. *The Interdependence of Agronomic Research, Resident and Extension Teaching.* J. S. OWENS, Extension Agronomist, Storrs, Connecticut.

5. *A Coordinated Program of Research and Extension.* (20 min.) C. H. MYERS, Professor of Plant Breeding, Cornell University, Ithaca, New York.

6. *Helps to Extension Workers in Determining the Needs of Soils and Crops.* (20 min.) E. VAN ALSTINE, Extension Specialist in Agronomy, Ithaca, New York.

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